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NOTE

Seed Feeding by a Multispecies Swarm of Flea Beetles (Coleoptera: Chrysomelidae: Galerucinae: Alticini)

The large and colorful flea beetle *Omophoita aequinoctialis* (L.) is a familiar sight in many Central American habitats, from forest edges and clearings to agricultural areas. However, despite its abundance, very little is known of its life cycle and behavior. In July 1999, a large swarm of these beetles was encountered in a forest fragment in southern Costa Rica at the Wilson Botanical Garden, Las Cruces, Puntarenas Province. The beetles were concentrated along a short length of trail, and many were seen briefly alighting on the leaves of understory plants. No feeding was apparent on any of these plants; their only use by the beetles was for brief rest periods. Many other individuals in the swarm were seen crawling on the surface of the leaf litter on the trail, or flying just above the ground. At the slightest disturbance, most of those on the ground also took wing and flew back up to the understory plants. The beetles in the leaf litter were observed feeding in the interior of broken seeds (Figs. 1, 2). These seeds, which were abundant in the litter along a 20 m stretch of the trail, came from a single canopy tree which was identified as *Aegiphila anomala* Pittier (Verbenaceae). Seen from the ground, there appeared to be numerous seedpods on the branches of the tree, but few intact seedpods were on the ground and all those were very old and decayed. Seeds of this tree, however, have very hard coats and persist after the rest of the fruit has disappeared. Most of the seeds had large holes or were broken in half. In contrast to the apparent nervousness of the beetles perched on plants or crawling on top of the leaf litter, beetles actively feeding inside the seeds were not readily disturbed and fed for several minutes at a time.

The beetle swarm was not composed entirely of *O. aequinoctialis;* about ten percent were *Asphaera nobilitata* (Fabr.) and a single individual of *Omophoita championi* Jacoby was also observed. The *Asphaera* were also seen seeking out and feeding on *Aegiphila* seeds. Both *Asphaera* and *Omophoita* belong to the subtribe Oedionychina within the Alticini, and are probably congeneric, although no phylogenetic analysis has yet been attempted. Fifteen specimens of *O. aequinoctialis* were collected and are deposited as vouchers in the Instituto Nacional de Biodiversidad (INBio) in Costa Rica.

Despite its abundance in Central America and northern South America, there are apparently no explicit host plant citations for *O. aequinoctialis.* In his description of *O. punctulata,* Bechyné and Bechyné (1963. Beiträge zur Kenntnis der Salvadorischen Chrysomeloidea. Iheringia—Zoologia 31: 62) reported that species as "found on Verbenaceae". Jolivet and Hawkeswood (1995. Host-plants of Chrysomelidae of the world. Backhuys Publishers, Leiden. 281 pp.) reported the genus *Omophoita* as associated with Verbenaceae, but without giving any specific references. On the other hand, a third species, *O. simulans* Jacoby, has been observed feeding on Convolvulaceae, as has *A. nobilitata* (Flowers and Janzen, 1997. Florida Entomologist 80: 334–366). The three *Omophoita* species *aequinoctialis, punctulata,* and *simulans* are all very similar in appearence, differing only in punctation and the shape of one of the pairs of elytral spots.

Except for the subfamily Bruchinae (whose larvae feed on seeds), feeding on seeds by any of the Chrysomelidae has not been previously reported. However, the association of the Las Cruces swarm with

Verbenaceae is consistent with what little has been reported in the literature concerning the host plants of *Omophoita.* The *Aegiphila* tree that produced the seeds had relatively few leaves, and these were all full of small holes consistent with Alticini feeding damage. Due to the height of the tree, it was not possible to see if there were any insects feeding on the leaves at the moment.

Gregarious behavior in leaf beetles is not uncommon and usually involves groups of adults and/or larvae exploiting a single or a group of host plants. Resulting aggregations are generally modest in size and involve a complex interplay of beetle responses to conspecifics, to their host plants, and tendencies to random movements (Morris et al. 1996. In P. H. A. Jolivet, and M. L. Cox, eds., Chrysomelidae Biology Volume 2: Ecological Studies. SPB Academic Publishing, Amsterdam, The Netherlands, pp. 303–322.). However, two species of the flea beetle genus *Macrohaltica* (Galerucinae, Alticini) form stable aggregations of as many as 5,000 individuals which move together from one food plant to the next, as well as staying in non-feeding swarms (Eberhard et al. 1993. Psyche 100: 93–119). In some Cassidini and Chrysomelinae, larvae form defensive aggregations, a phenomenon called cycloalexy (Vasconcellos-Neto and Jolivet. 1988. Bulletin de la Société entomologique de France 92(9–10): 291–299), while in a number of species the females stay with and protect their larval broods (Jolivet. 1999. *In* M. L. Cox, ed., Advances in Chrysomelidae Biology 1. Backhuys Publishers, Leiden, pp. 391–409; Windsor and Choe. 1994. *In* P. H. Jolivet, M. L. Cox, and E. Petitpierre, eds., Novel Aspects of the Biology of the Chrysomelidae. Kluwer Academic Publishers, The Netherlands, pp. 111–117). Other Cassidini also form aggregations during dormancy in tropical dry forests (Flowers. 1991. Biotropica 23: 308–310).

Swarming behavior with a different objective has been documented in the Clytrini (Monrós. 1953. Acta Zoológica Lilloana 14: 5–274; Flowers et al. 1994. Coleopterists' Bulletin 48: 79–89; Flowers and Janzen 1997) and Alticini (Flowers and Tiffer. 1994. Brenesia. 37:135–136). Here the activity is apparently a part of mating behavior, although feeding by individuals not actively copulating can result in substantial plant damage. Taxa where this form of mating behavior has been observed include the Clytrini genera *Anomoea* (Flowers et al. 1994), *Babia* (Flowers and Janzen 1997), *Megalostomis,* and *Temnodachrys* (Monrós 1953), and an unidentified species in the monoplatine flea beetle genus *Hypolampsis* (Alticini; Flowers and Tiffer 1994).

The swarming in *Omophoita* and *Asphaera* observed at Las Cruces does not fit into any of the types of gregariousness known to date in the Chrysomelidae. No mating activity was observed, and the seed feeding was well outside the normal leaf feeding behavior of Alticini. A further complicating aspect is that while beetles were seen feeding on opened seeds, none were seen chewing through the seed hulls. Thus, the opened seeds could have been a bonanza for the beetles inadvertently provided by some vertebrate, possibly a rodent (Luis Diego Gomez, personal communication), and the beetles may have been opportunistically feeding on a part of their normal host plant that is not normally accessible. Such opportunistic feeding in Chrysomelidae has also been observed in another flea beetle which feeds on *Euphorbia elata* (Euphorbiaceae). If a stalk of this plant is broken, the sap flowing from the cut stem rapidly attracts large numbers of *Centralaphthona* nr. *lessmanni* Bechyné & Bechyné (Chrysomelidae: Galerucinae: Alticini; Flowers and Janzen 1997). It appears that in at least these few chrysomelid species, secondary plant compounds in parts other than leaves can stimulate strong feeding responses, enabling the leaf beetles to occasionally exploit non-leaf parts of their host plants.

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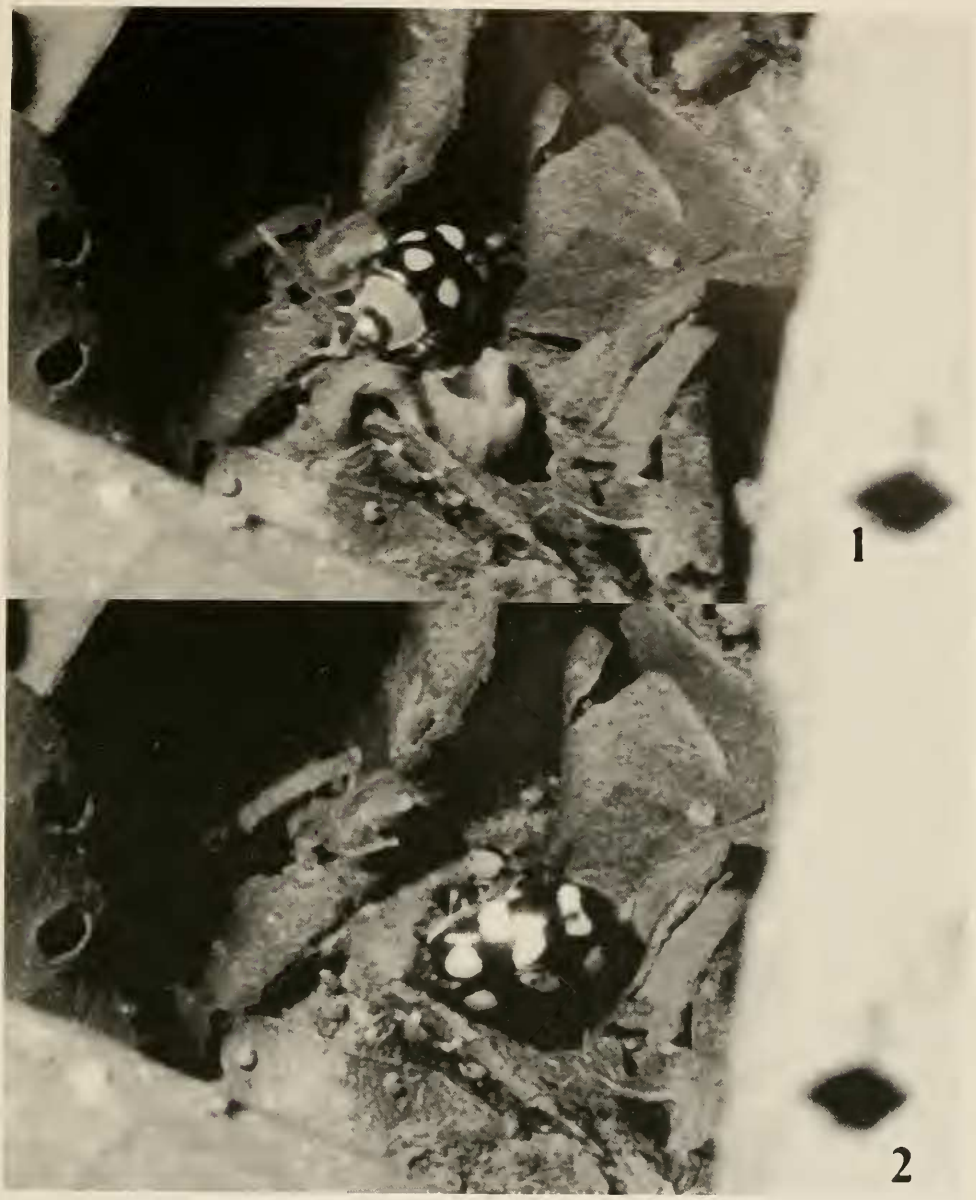

Figs. 1–2. *Omophoita aequinoctialis.* 1, On seeds of *Aegiphila anomala.* 2, Feeding inside seed of *A. anomala.*

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R. Wills Flowers, *Agricultural Research Programs, Florida A&M University, Tallahassee, FL 32307, U.S.A. (e-mail: r.flowers@famu.edu)*